Canadian Data Report of

Fisheries and Aquatic Sciences

No. 194

April 1980

DATA FROM THE COMMERCIAL FISHERY FOR LAKE WHITEFISH, *Coregonus clupeaformis* (Mitchill), ON GREAT SLAVE LAKE, NORTHWEST TERRITORIES, 1979

by

R.W. Moshenko and G. Low

Western Region

Department of Fisheries and Oceans

Winnipeg, Manitoba R3T 2N6

This is the 27th Data Report

from the Western Region, Winnipeg

2008-03724/

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Cat. no. Fs 97-13/194 ISSN 0706-6465

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ABSTRACT

Moshenko, R.W., and G. Low. 1980. Data from the commercial fishery for lake whitefish, *Coregonus clupeaformis* (Mitchill), on Great Slave Lake, Northwest Territories, 1979. Can. Data Rep. Fish. Aquat. Sci. 194: v + 29 p.

Data from the fish plant sampling and fishery observations on the Great Slave Lake commercial fishery, summer and partial winter, are presented. Production and catch per unit of effort by vessel type at weekly intervals by fishing area are shown. A total of 4472 lake whitefish were sampled for age, length and weight. From the fishery observations, 28 vessels lifting 1291 nets (129,100 yd) were sampled for catch, effort and cullage.

Key words: catch composition; catch/effort; catch statistics; commercial fishing; exploitation; fishery management; life history; mesh regulations; monitoring.

RESUME

Moshenko, R.W., and G. Low. 1980. Data from the commercial fishery for lake whitefish, *Coregonus clupeaformis* (Mitchill), on Great Slave Lake, Northwest Territories, 1979. Can. Data Rep. Fish. Aquat. Sci. 194: v + 29 p.

L'étude présent les données décollant d'un échantillonnage d'une usine de traitement du poisson et d'observations sur la pêche commerciale dans le Great Slave Lake, à l'été et à l'hiver partial. Elles montrent la production et la prise par unité d'effort, et des intervalles hebdomadaires, par type de bateau et par zone de pêche. On à prélevé 4472 grands corégones pour en déterminer l'age, la longueur et le poids. Quant aux observations sur la pêche, elles ont vise 28 bateaux remontant 1291 filet (129,100 verges) et ont porté sur la prise, l'effort et le triage.

Mots-clés: composition de la prise; prise/effort; statistiques des prises; pêche commerciale; exploitation; gestion de la pèche; cycle évolutif; réglementation du maillage; surveillance.

INTRODUCTION

In 1971, The Department of Fisheries began a long term stock assessment and monitoring program designed to collect information considered essential for the sound management of the Great Slave Lake commercial fishery, consistent with the recommendations of the Great Slave Working Party (1969). The objectives of this program are:

i) to maintain a record of the total commercial landings (production) by species, by weight and by administrative area;

ii) to monitor the catch per unit of effort (CPE), cullage and change in relative abundance of all fish species landed through sampling of commercial net hauls;

iii) to assess the change in age, size, growth rate and mortality - especially in lake whitefish, and

iv) to assess the population structure of the various fish species.

In order to meet these objectives, a three-component field study was implemented. This consisted of:

i) Fish plant sampling - monitoring the landings of all commercial species and sampling the catch for biological information (age, length, weight), with special emphasis on lake whitefish;

ii) Fishery observations - monitoring the catch per unit of effort, cullage and relative abundance of all species landed, and

iii) Experimental netting - setting standard gangs of gillnets in the traditional commercial fishing areas of the lake.

Results of this work for the years 1972 to 1978 have been described by Bond (1974a. b, 1975a, b), Bond and Turnbull (1973), Moshenko and Low (1978a, b, 1979) and Moshenko et al. (1978).

Bond and Turnbull (1973) stated that lake whitefish population(s) in the western basin of Great Slave Lake were not overexploited. Healey (1975) discussed the effects of different levels of exploitation on lake whitefish populations in four lakes (Chitty, Drygeese, Baptiste and Alexie) north of Yellowknife during the period 1972-75. He found that as mortality is increased through increased exploitation, whitefish compensate by increasing their growth rates and correspondingly mature younger. Thus, a whitefish population with low mortality and slow growth rate possibly has a strong potential for exploitation. The optimum response of increased growth rates to heavy exploitation appears to occur when the bulk of the stable yield comes from fish five to eight years old. The level of exploitation of the population can be established by examining the growth rate, age of maturity, and age structure of the population. In 1978, after eight years of the exploitation experiment in these four lakes, Healey (1980) stated that significant increases in average size-at-age were recorded in the exploited lakes, and the degree and persistence of the increase were proportional to the intensity of exploitation.

In Great Slave Lake, whitefish growth rate is still relatively slow and the mortality is moderate. The bulk of whitefish biomass is in fish under age-group 9 (Healey 1975). Over the past thirty years, the 5½ (140 mm) mesh commercial fishery has not significantly affected the age-group where the biomass is greatest. The harvest is, therefore, coming from older and somewhat unproductive age groups 7-12, and the sustainable yield is lower than the population could support if younger fish were being harvested. Whitefish production dropped from 3.2 million pounds (1455 tonnes) in 1970 to about 2.0-2.3 million (909-1045 tonnes) between 1973-76 and increased slightly to a 2.5 million pounds (1136 tonnes) average for 1977 to 1979.

To apply Healey's research findings, an experimental management scheme was implemented at the start of the open-water season in 1977. The minimum mesh size was lowered from 5½ in (140 mm) to 5¼ in (133 mm). This measure is intended to bring about an exploitation of younger age-groups of whitefish where the bulk of biomass lies, elicit a further increase in growth, and a decrease in age of maturity, and increase the catch per unit of effort (CPE). The effects of the mesh change on the whitefish population(s) is to be closely monitored and quotas will be adjusted accordingly until the optimum level of exploitation is attained. In addition, the quota for whitefish and trout was lowered from 4.785 million pounds (2175 tonnes) to 3.4 million pounds (1546 tonnes). This was intended to protect the whitefish populations from over exploitation which could result with the anticipated increase in CPE. A new licencing policy and limited entry into the fishery has been implemented. Persons wishing to enter the fishery apply through the Department of Fisheries and Oceans. Applications are reviewed by the Great Slave Lake Advisory Committee consisting of two representatives of the Fishermen's Federation, one from the NWT Tourist Industry Association, two from the Department of Fisheries and Oceans and two from the Government of the Northwest Territories. The Board meets twice annually; spring and fall. The decision for new entrants into the fishery is based on a point system which takes into account residency, fishing experience and family history in the fishery.

During 1979, the two components (fish plant sampling and fishery observations) of the program were carried out. This report summarizes, in tabular form, the data gathered from these two aspects of the program.

MATERIALS AND METHODS

STUDY AREA

Great Slave Lake lies in the southwest corner of the District of Mackenzie, Northwest Territories (Fig. 1). It is the fifth largest lake in North America, having a surface area of 27,195 km^2 and a drainage area of 985,300 km^2. Stretching 440 km from its extreme east end to the outlet of the Mackenzie River, the lake straddles two physiographic regions. The northeast shore of the north arm and the east arm lie withing the Precambrian Shield and have irregular, precipitous margins. The western portion of the lake overlies the alluvial plain known as the Mackenzie Lowlands and has few islands and gently sloping shores. The rivers entering the lake from the Shield are cold, clear and rapidly flowing while those entering from the

south are slow flowing brown water streams laden with silt during spring and early summer. While the western basin has a maximum depth of about 165 m and a mean depth of 42 m, a depth of 625 m has been recorded in the east arm. Physical and biological characteristics of the lake have been described previously in detail by Rawson (1950, 1951, 1953a, b).

DESCRIPTION OF THE FISHERY

Great Slave Lake has been fished commercially since 1945. During the 1950's annual production of whitefish and trout averaged 6.5 million pounds (2955 tonnes) as the large accumulated stock was exploited. Since the 1950's commercial production of both species has decreased annually and whitefish and trout have reacted differently to exploitation (Keleher 1972). The west end of the lake is now being managed for whitefish production with minimal regard to lake trout which have been unable to withstand commercial gillnetting. Other than the mesh change in 1977 from 5½ in (140 mm) to 5¼ in (133 mm), gillnets of 5½ in (140 mm) stretched mesh have been the sole means of exploitation with no restriction on number of nets since 1961. During its history almost the entire lake has been open to commercial fishing although certain areas have been closed to protect Indian subsistence and sport fishing (Fig. 1 and Northwest Territories Fishery Regulations 1979). The east arm of Great Slave Lake (Area VI) was closed to commercial fishing in 1974 and is being managed exclusively for Indian subsistence, and sport fishing (Moshenko and Gillman 1978).

A minimum of 25 fish species occur in the lake (Keleher 1972) of which only five are of commercial importance. The major commercial species in decreasing order of importance are lake whitefish, *Coregonus clupeaformis* (Mitchill); lake trout, *Salvelinus namaycush* (Walbaum); inconnu, *Stenodus leucichthys* (Pallas); northern pike, *Esox Lucius* (Linnaeus) and walleye (pickerel), *Stizostedion vitreum vitreum* (Mitchill). Cisco, *Coregonus* spp; burbot, *Lota lota* Linnaeus) and longnose sucker, *Catostomus catostomus* (Forster) may constitute up to 40% or more of the total species catch (Table 6); however, they are culled on the lake due to lack of market demand.

For the management of the commercial fishery the lake is divided into six administrative areas and a portion of the total annual quota of 3,550,000 (1610 tonnes) round weight of whitefish and trout is allotted to each area (Table 1). The annual quota is based on the period commencing 1 November and terminating on the following 31 October and applies to the combined catch for both the simmer and winter fishery. More detailed histories of the commercial fishery on Great Slave Lake are discussed by Kennedy (1956), Keleher (1972), and Bond and Turnbull (1973). The description of the winter and summer fisheries is summarized by Moshenko et al. (1978).

During the 1979 season, summer production made up 41% of the total. Records from the previous summer season of 1978 indicate the following vessel production data:

	Whitefish Boats	Bowpickers	Skiffs
Production -			
% of total	67	4	29
average (lb)	79,000	9,000	11,600
range (lb)	11,000-173,000	1,000-19,400	1,000-62,800
lb/delivery (average)	1,600	500	500
Level of individual production (lb) for 50% of the operators	>75,000	>10,100	>7,000

Winter and summer prices, (¢/lb) to fishermen, basis loose fish, F.O.B. Hay River Plant are shown below:

	Winter 1978-79			Summer
Species and Form	fresh		frozen	1979 fresh
Whitefish -				
export (dressed)-smokers	-	-	-	44.5
jumbo (> 4 lb)	65[a]	70[b]	52	54.5
large (3-4 lb)	55	60	44	44.5
medium (1½-3 lb)	45	60	36	39.0
small (1-1½ lb)	25	40	20	29.5
Lake trout -				
dressed-medium (4-8 lb)	38	43	-	46.5
-small (<4 lb)	36	46	-	38.5
headless dressed (>8 lb)	25	-	-	41.5
Pickerel -				
round	59	79	47	61.5
headless dressed	70	-	-	86.5
Northern pike -				
head-on dressed (2-4 lb)	-	-	-	19.5
(4-9 lb)	24	-	19	31.5
headless dressed (> 1½ lb)	17	-	11	19.5
Inconnu -				
headless dressed	15	-	12	17.5

[a] Price effective November 1, 1978 (all prices in b column).

[b] Price effective March 5, 1979 (all prices in column).

In addition, final payments were provided to fishermen for the fish produced during the summer of 1978 and winter 1978-79 (ending 30 April 1979) as follows:

Species and Form	¢/lb
Whitefish - export	20.5
continental	11.0
smoker	16.5
Trout	13.0
Pickerel - round	20.0
dressed	23.5
headless dressed	27.5
Northern pike	9.0
Inconnu	5.0

Source: Freshwater Country, Nov. 1979, Issue No. 3.

FISH PLANT SAMPLING

Monthly summaries of the landings by administrative area of five commercial species were compiled from the Freshwater Fish Marketing Corporation (FFMC) sales slips by Fisheries and Oceans staff in Hay River. Production figures are presented in pounds round weight. The following factors were used to convert to round weight: dressed weight x 1.2 round weight; dressed headless weight x 1.4 = round weight. These factors rounded to one decimal were used regardless of species (Keleher 1964). Production values presented in this report (Tables 2 and 3) include whitefish culls at the plant but do not include an estimate of cull discarded (Table 15) on the lake due to deterioration following extended periods in the nets (usually the result of storms). Fishermen cull these fish as the nets are lifted. Fish which do not meet the market size and quality requirements are further culled by graders at the fish plant and the weight is recorded on the sales slip. Cullage on the lake was not subtracted from the quota again this season. Cullage will be subtracted from the lake quota when management programs provide a good estimate of lake cullage. Production data and mesh size are given in the English measurements (pounds and inches) since these are used in the Northwest Territories Fishery Regulations.

Commercial landings of whitefish were sampled at each of the four fish plants: Hay River, Moraine Bay, Wool Bay and Simpson Islands (Fig. 1). A minimum of 300 dressed (head-on) whitefish were sampled each month during the summer season from Areas IE (Hay River), II (Moraine Bay), IV (Wool Bay) and V (Simpson Islands). In addition whitefish were sampled from the Area IW winter fishery in December and July. Whitefish from Area III were not sampled this year due to limited production. Boxes of fish were selected at random from the catches of the various fishermen as they arrived at the plant. All whitefish in the box, up to a maximum of 75 fish per individual fisherman were sampled. Thus, the sample of 300 whitefish should have been taken from at least four different fishermen. Fork length (±1 mm), dressed weight (±50 g) and scales were taken from the left side from the area just above the lateral line and below the dorsal fin.

FISHERY OBSERVATIONS

Fishery observations were conducted by placing summer staff onboard the commercial fishing vessels. These observers accompanied the fishermen when they left port in the morning and returned with them the same day. Fishermen were interviewed for information pertaining to number of nets set, location and duration of net-gang sets, mesh size, mesh depth, twine size, depth fished, descriptive features of the fishing vessel and size of the crew. As the nets were lifted, observers kept a record of the number of fish of each species caught and culled per net-gang (usually 5-8 nets). Later, at the fish plant or at the Fisheries and Oceans office in Hay River production and cullage at the plant was recorded from the FFMC sales slips for that particular fishing vessel. Observations were conducted during July and August in all areas, except Area III, with an attempt to obtain information on all types of fishing vessels from each area. Observations were not conducted aboard bowpickers in 1979.

DATA ANALYSIS

Fisheries observation summaries

Data used to compile Table 5 were obtained from interviewing the fishermen during the fishermen observation program. The number of nets listed in the table represent the quantity of nets the fisherman generally has in the water at any one time. It does not represent the number of yards of net lifted during the observations. Mean number of nets per boat was determined by dividing total nets by the number of observations. Mean number of nets and net gangs lifted per day were calculated from interview information. Generally whitefish boats fished half their gear each day and skiffs either fished all gear each day or half each day depending on the particular fisherman. Depth of nets and mean number of men per boat were derived from interview material.

To determine the percentage of 5½ in mesh gill-nets used on Great Slave Lake the operator was asked the number of nets of each mesh size he was using. The legal minimum mesh size on the lake is 5¼ in (133 mm) stretched mesh, however, fishermen may choose to use a larger mesh size. Table 5 lists the percentage of 5½ in (140 mm) reported on the lake by skiff and whitefish boat operators. We learned in the fall that the nets reported to us as $5\ ^{5}/_{16}$ in (135 mm) measured out to be 5½ in (140 mm). These nets were labelled by the supplier as $5\ ^{5}/_{16}$ in (135 mm) but were later measured to be 5½ in (140 mm). Conservation and Protection records verified that nets reported to us as $5\ ^{5}/_{16}$ in (135 mm) were, indeed, 5½ in (140 mm). In all cases where $5\ ^{5}/_{16}$ in (135 mm) nets were reported we changed our records to read 5½ in (140 mm).

Data used to compile Table 6 were obtained during fisherman observations. The numbers of fish of each species are totals from direct counts made as the fishermen's nets were lifted. The number of yards of net represents a count of the number of yards of net lifted multiplied by the number of 24 hour periods each net was set. The number of fish of each species was then divided by the yardage value to derive the number of fish/100 yd of net/24 hour period. Catch per unit effort (lb rd wt/100 yd/24 h) was then calculated by multiplying the above result by the mean round weight of the particular species.

Catch per unit of effort (CPE)

Number of vessel deliveries and whitefish landings (production in pounds round weight) by weekly intervals for each administrative area (Table 7) were calculated as follows:

i) Compiled the number of deliveries/fisherman (operator)/week from FFMC sales slips for each administrative area.

ii) Separated data by vessel type: skiff, bow-picker and whitefish boat.

iii) Calculated weekly totals for each vessel type.

iv) Tabulated number of deliveries per weekly period for each administrative area and all areas combined.

v) Tabulated weekly production values from FFMC

sales slips and converted to round weight by multiplying by the factor 1.2 (Keleher 1964).

Total whitefish production, estimates for total number of nets used and CPE (pounds round weight/100 yd/24 h) by weekly intervals (Tables 8-14) were calculated as follows:

i) Weekly whitefish production by area was tallied from the FFMC sales slips and converted to round weight.

ii) The number of lifts/week/area were tallied from FFMC sales slips with each delivery treated as one lift. The data were calculated separately for skiffs, bowpickers and whitefish boats.

iii) It was determined from the 1979 fishery observations that the average number of nets used by the various vessel types (Table 5) was as follows: 18 nets for skiffs and 71 nets for whitefish boats. Since observations were not conducted on bowpickers this season the 1978 value of 24 nets per bowpicker was used. Fishery observations also showed that skiffs usually lifted all nets each day while most bowpickers and whitefish boats lifted only half of the nets each day, weather permitting. Thus, for bowpickers and whitefish boats each lift represents a set time (nets down) of at least 48 hours. Since, CPE is in pounds round weight/100 yd/24 h, the following calculations were made to correct this:

net factor (NF) = (% of total nets lifted/day) multiplied by (number of 24 h periods nets were down)

Thus, net factors (NF) for the various vessel types were as follows:

skiffs = (100% x 18 nets) (1 period) = 18

bowpickers = (50% x 24 nets) (2 periods) = 24

whitefish boats = (50% x 71 nets) (2 periods) = 71

iv) The number of nets used was calculated by multiplying the appropriate net factor (NF) by the number of weekly lifts/vessel type and combining the totals.

v) CPE (pounds round weight/100 yd/24 h) was calculated by dividing production by the number of nets.

Biological data

The scale age was determined by counting the number of completed annuli. Thus, an age 10 fish was in its eleventh year.

Dressed weights for whitefish shown in Table 18 may be converted to approximate round weights by multiplying by a factor of 1.173 (Keleher 1964).

Annual mortality rates (natural and fishing) were calculated using the method (all ages known) outlined by Robson and Chapman (1961). The total annual mortality is defined as the number of fish which die during a year, divided by the initial number (Ricker 1975). Thus, if the mortality rate was 60%, then among the larger fish beyond the age where they are fully vulnerable to the fishery, out of every 100 fish alive at a given time 60 are expected to die during the next year. The right hand descending portion of a catch curve may be used to estimate annual mortality rates if the following assumptions can be met:

i) constant survival or mortality rates over the range of age-classes, and with time,

ii) constant year-class strength (even recruitment), and

iii) all fish beyond some age are equally vulnerable to the harvesting gear.

Ricker (1975) Indicated that the modal age in the catch curve will commonly lie quite close to the first year in which recruitment can be considered effectively complete. Recruitment is defined as the addition of new fish to the vulnerable population by growth among small size categories. In our calculations, we first selected the modal age-class and then chose the next older age-class to be sure that all fish beyond this age are at the age of effectively complete recruitment and fully susceptible to the gear.

The majority of the data collected during the study were analyzed using the computer facilities at the University of Manitoba as well as a Hewlett-Packard (model 9810-A) programmable calculator.

ACKNOWLEDGMENTS

The authors wish to thank all the commercial fishermen and staff of the Freshwater Fish Marketing Corporation on Great Slave Lake for their co-operation. Summer field assistance was provided by L. Brown and R. McCarthy. C. Read provided the scale age determinations and assisted B. Mackenzie with data analysis. A special thanks goes to the staff of Fisheries and Oceans at Hay River and Yellowknife for their support. M.R. Falk reviewed the report. Typing was done by J. Hubeck, N. Kroeker and N. Ziprick.

REFERENCES

BOND, W.A. 1974a. The Great Slave Lake commercial fishery, summer, 1973. Can. Fish. Mar. Serv. Tech. Rep. Ser. CEN/T-74-B: 38 p. 1974b. Data on ciscoes, burbot, and longnose suckers from Great Slave Lake, N.W.T., 1973. Can. Fish. Mar. Serv. Rep. Ser. CEN/D 74-3: 44 p.

1975a. Commercial fishery data from Great Slave Lake, N.W.T., 1974. Can. Fish. Mar. Serv. Data Rep. Ser. CEN/D-75-5: 24 p.

1975b. Results of an experimental gill-netting program at the west end of Great Slave Lake, N.W.T. during swimmer, 1974. Can. Fish. Mar. Serv. Data Rep. Ser. CEN/D-75-7: 83 p.

BOND, W.A., and T.D. TURNBULL. 1973. Fishery Investigations at Great Slave Lake, Northwest Territories 1972. Can. Fish. Mar. Serv. Tech. Rep. Ser. CEN/T-73-7: 7B p.

GREAT SLAVE LAKE WORKING PARTY. 1969. Unpublished Report. 20 p.

HEALEY, M.C. 1975. Dynamics of exploited whitefish populations and their management with special reference to the Northwest Territories. J. Fish. Res. Board Can. 32: 427-448.

1980. Growth and recruitment in experimentally exploited lake whitefish *(Coregonus clupeaformis)* populations. Can. J. Fish. Aquat. Sci. 37: 255-267.

KELEHER, J.J. 1964. Round weight conversion factors for Great Slave Lake fish. Fish. Res. Board Can. MS Rep. 773: 19 p.

1972. Great Slave Lake: effect of exploitation on salmonid community. J. Fish. Res. Board Can. 29: 741-753.

KENNEDY, W.A. 1956. The first ten years of commercial fishing on Great Slave Lake. Bull. Fish. Res. Board Can. 107: 58 p.

MOSHENKO, R.W., and D.V. GILLMAN. 1978. Creel census and biological investigation on lake trout, *Salvelinus namaycush* (Walbaum), from Great Bear and Great Slave lakes, Northwest Territories, 1975-76. Can. Fish. Mar. Serv. MS Rep. 1440: v + 37 p.

MOSHENKO, R.W., and G. LOW. 1978a. Lake whitefish, *Coregonus clupeaformis* (Mitchill), from the commercial fishery of Great Slave Lake, Northwest Territories, 1975-76. Can. Fish. Mar. Serv. Data Rep. 53: iv + 16 p.

1978b. An experimental gillnetting program on Great Slave Lake, Northwest Territories, 1977. Can. Fish. Mar. Serv. Data Rep. 102: vi + 51 p.

1979. Data from the commercial fishery for lake whitefish, *Coregonus clupeaformis* (Mitchill), on Great Slave Lake, Northwest Territories, 1978. Can. Fish. Mar. Serv. Data Rep. 139: v + 29 p.

MOSHENKO, R.W., L.W. DAHLKE, and G. LOW. 1978. Data from the commercial fishery for lake whitefish, *Coregonus clupeaformis* (Mitchill), on Great Slave Lake, Northwest Territories, 1977. Can. Fish. Mar. Serv. Data Rep. 101: v + 30 p.

NORTHWEST TERRITORIES FISHERY REGULATIONS. P.C. 1974 - 1106, amended P.C./C.P. 1979 - 1680 October 30, 1979.

RAWSON, D.S. 1950. The physical limnology of Great Slave Lake. J. Fish. Res. Board Can. 8: 1-166.

1951. Studies of fish of Great Slave Lake. J. Fish. Res. Board Can. 8: 207-240.

1953a. The standing crop of plankton in lakes. J. Fish. Res. Board Can. 10: 224-237.

1953b. The bottom fauna of Great Slave Lake. J. Fish. Res. Board Can. 10: 486-520.

RICKER, W.E. 1975. Computations and Interpretations of biological statistics of fish populations. Bull. Fish. Res. Board Can. 119: 382 p.

ROBSON, D.S., and D.G. CHAPMAN. 1961. Catch curves and mortality rates. Trans. Am. Fish. Soc. 90(2): 181-189.

ERRATA

MOSHENKO, R.W., and G. LOW. 1979. Data from the commercial fishery for lake whitefish, *Coregonus clupeaformis* (Mitchill), on Great Slave Lake, Northwest Territories, 1978. Can. Fish. Mar. Serv. Data Rep. 139: v + 29 p.

Please note and make the following two corrections for the above stated report:

1. In Table 5, % 5½ in nets of total nets used under "Total" column should be "27.1" Instead of "15.9".

2. In Table 6, number of whitefish in Moraine Bay should be "1,815" instead of "1,185".

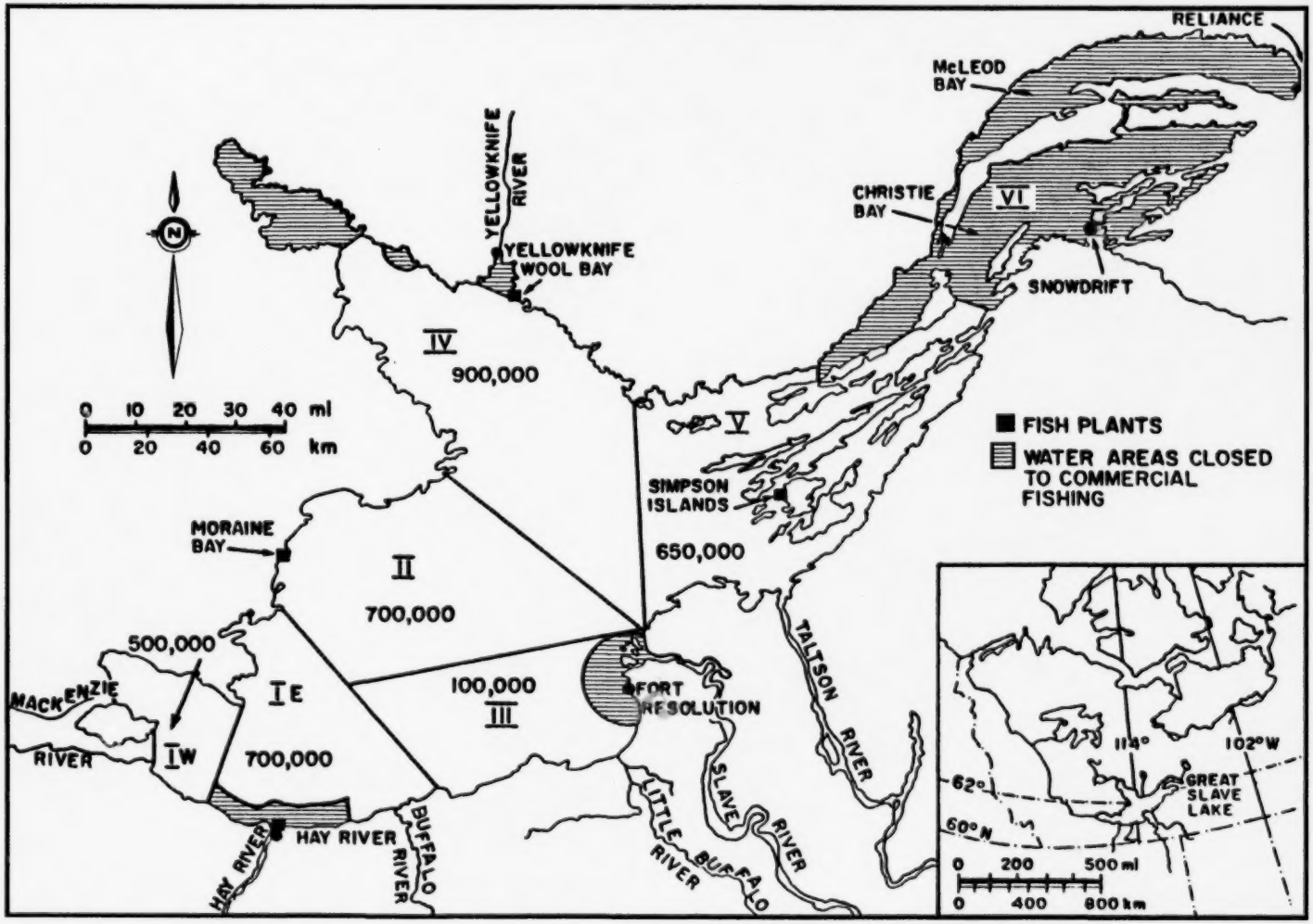

Fig. 1. Map of Great Slave Lake showing the administrative areas and quotas (pounds round weight) in effect during 1979, areas closed to commercial fishing and the location of fish plants.

Table 1. Commercial quotas in effect on Great Slave Lake during the 1976 to 1979 seasons.

Administrative Area	Commercial quota of whitefish and lake trout (pounds round weight)		
	1976[a]	1977, 1978[b]	1979[c]
IW (winter only)[d]	500,000	500,000	500,000
IE	700,000	700,000	700,000
II	1,500,000	700,000	700,000
III	-	-	100,000
IV	1,370,000	900,000	900,000
V	715,000	600,000	650,000
Total	4,785,000	3,400,000	3,550,000

[a] November 1, 1975 - October 31, 1976.

[b] November 1, 1976 - October 31, 1978.

[c] November 1, 1978 - October 31, 1979.

[d] Area IW was opened to summer fishing in 1979 (trial basis).

Table 2. Total production of commercial species (pounds round weight) by administrative areas, 1979.

Species	Production from each administrative area						Total
	IW	IE	II	III	IV	V	
Whitefish	528,468	280,273	446,904	5,782	589,568	495,941	2,346,936
Trout	11,487	46,264	10,661	-	14,576	183,618	266,606
Pike	129,847	21,253	28,379	404	52,825	52,633	285,338
Inconnu	31,278	186,920	3,924	2,608	18,097	95,388	338,215
Walleye	528	2,720	22	410	6,177	3,750	13,607
Total	701,608	537,430	489,890	9,201	681,243	831,330	3,250,702

Table 3. Production of whitefish and trout (pounds round weight) from each administrative area for winter and summer seasons, 1979.

Administrative Area	Winter		Summer		Total		Total
	Whitefish	Trout	Whitefish	Trout	Whitefish	Trout	
IW	310,603	2,724	217,865	8,763	528,468	11,487	539,955
IE	10,199	158	270,074	46,106	280,273	46,264	326,537
II	92,072	1,475	354,832	9,186	446,904	10,661	457,565
III	-	-	5,782	-	5,782	-	5,782
IV	112,912	396	476,656	14,180	589,568	14,576	604,144
V	185,899	37,872	310,042	145,746	495,941	183,618	679,559
Total	711,685	42,625	1,635,251	223,981	2,346,936	266,606	2,613,542

Table 4. Information on vehicle and vessel operations, number of men and number of nets used in the Great Slave Lake commercial fishery, winter 1978-79 and summer 1979.

Winter Fishery[a] (November - May):

	No. of vehicles	Total no. of men	No. of men /vehicle	No. of nets /vehicle
bombardier	28	56	2	30
skidoo	7	10	1.4	15
Total	35	66	-	-

Summer Fishery (June - October):

	No. of vessels	Total No. of men	No. of men /vessel	No. of nets /vessel
skiffs[b]	50	74	1.5	24
bowpickers[c]	4	8	2	30
whitefish boats[d]	20	76	3.8	71
Total	74	155	-	-

[a] Information obtained from Conservation and Protection records, Hay River.

[b] Based on 13 of 50 skiffs.

[c] Based on 2 of 4 bowpickers (1978 data).

[d] Based on 15 of 20 whitefish boats.

Table 5. Summary information from fishery observations on vessels and gillnets used during the summer commercial fishery, Great Slave Lake, 1979.

	Skiffs		Whitefish Boats		Total	
	No. of observations	No. of nets	No. of observations	No. of nets	No. of observations	No. of nets
Hay River (IW)	-	-	1	64	1	64
Hay River (IE)	3	35	3	200	6	235
Moraine Bay (II)	3	68	6	457	9	525
Wool Bay (IV)	4	80	2	126	6	206
Simpson Islands (V)	3	44	3	217	6	261
Total	13	227	15	1064	28	1291
Mean no. nets/boat	-	17.5	-	70.9	-	-
Mean no. nets lifted/day	-	10.6	-	35.5	-	-
Mean no. net-gangs lifted/day	-	3.2	-	5.0	-	-
Depth of nets (meshes)	-	30-80	-	40-80	-	-
Mean no. of men/boat	-	1.5	-	4.1	-	-
% 5½" nets of total nets used[a]	-	51.5	-	75.3	-	71.0

[a] Based on fishery observations, and Conservation and Protection (Hay River office) - see materials and methods for explanation.

Table 6. Species composition and CPE (lb rd wt/100 yd/24 h) by area from the fishery observations summer, 1979.

Yards of net	Hay River (area IE) 29,600				Moraine Bay (area II) 50,600				Wool Bay (area IV) 19,000				Simpson Is. (area V) 28,400				Area IW 6,000				Total 133,600			
	Fish Caught				Fish Caught				Fish Caught				Fish Caught				Fish Caught				Fish Caught			
Species	No.	% of total	No./ net[a]	CPE[b]	No.	% of total	No./ net[a]	CPE[b]	No.	% of total	No./ net[a]	CPE[b]	No.	% of total	No./ net[a]	CPE[b]	No.	% of total	No./ net[a]	CPE[b]	No.	% of total	No./ net[a]	CPE[b]
L. whitefish[c]	2759	54.1	9.3	21.8	4550	88.2	9.0	21.1	1264	83.5	6.7	15.4	1901	62.6	6.7	15.7	1660	75.9	27.7	85.9[d]	12134	71.4	9.1	21.3
Cisco	1381	27.1	4.7	4.7	185	3.6	0.4	0.4	125	8.3	0.7	0.7	126	4.2	0.4	0.4	59	2.7	1.0	1.0	1876	11.0	1.4	1.4
Burbot	473	9.3	1.6	5.6	200	3.9	0.4	1.4	47	3.1	0.1	0.4	381	12.5	1.3	4.6	43	2.0	0.7	2.5	1144	6.7	0.9	3.1
Suckers	392	7.7	1.3	3.9	167	3.2	0.3	0.9	15	1.0	0.2	0.6	506	16.7	1.8	5.4	342	15.6	5.7	17.1	1422	8.4	1.1	3.3
L. trout	63	1.2	0.2	-	26	0.5	0.1	-	4	0.3	-	-	9	0.3	-	-	60	2.7	1.0	-	162	1.0	0.1	-
Inconnu	16	0.3	-	-	6	0.1	-	-	2	0.1	-	-	69	2.3	0.2	-	5	0.2	0.1	-	98	0.6	0.1	-
N. pike	13	0.3	-	-	25	0.5	-	-	54	3.6	0.3	-	31	1.0	0.1	-	19	0.9	0.3	-	142	0.8	0.1	-
Walleye	-	-	-	-	-	-	-	-	1	0.1	-	-	15	0.5	-	-	-	-	-	-	16	0.1	-	-
Grayling	-	-	-	-	-	-	-	-	1	0.1	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Goldeye	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-
Total	5097	-	19.3	-	5159	-	10.1	-	1513	-	8.0	-	3039	-	10.0	-	2188	-	36.5	-	16996	-	12.1	-

[a]Number of fish/100 yd of net/24 hour period.

[b]Mean round weights for cisco, burbot and suckers taken from Bond 1975b.

[c]Mean round weight taken from experimental netting in 1977 (Moshenko and Low 1978b).

[d]Mean round weight taken from Area IW plant sample, 1979.